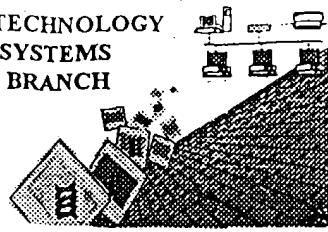# RAW SEQUENCE LISTING
ERROR REPORT

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) detected errors when processing the following computer readable form:

Application Serial Number: *10/797,553*
Source: *TWO*
Date Processed by STIC: *7/22/04*

THE ATTACHED PRINTOUT EXPLAINS DETECTED ERRORS.
PLEASE FORWARD THIS INFORMATION TO THE APPLICANT BY EITHER:
1) INCLUDING A COPY OF THIS PRINTOUT IN YOUR NEXT COMMUNICATION TO THE APPLICANT, WITH A NOTICE TO COMPLY or,
2) TELEPHONING APPLICANT AND FAXING A COPY OF THIS PRINTOUT, WITH A NOTICE TO COMPLY
FOR CRF SUBMISSION AND PATENTIN SOFTWARE QUESTIONS, PLEASE CONTACT MARK SPENCER, TELEPHONE: 571-272-2510; FAX: 571-273-0221

TO REDUCE ERRORED SEQUENCE LISTINGS, PLEASE USE THE **CHECKER VERSION 4.2 PROGRAM**, ACCESSIBLE THROUGH THE U.S. PATENT AND TRADEMARK OFFICE WEBSITE. SEE BELOW FOR ADDRESS:
http://www.uspto.gov/web/offices/pac/checker/chkrnote.htm

Applicants submitting genetic sequence information electronically on diskette or CD-Rom should be aware that there is a possibility that the disk/CD-Rom may have been affected by treatment given to all incoming mail. Please consider using alternate methods of submission for the disk/CD-Rom or replacement disk/CD-Rom. Any reply including a sequence listing in electronic form should NOT be sent to the 20231 zip code address for the United States Patent and Trademark Office, and instead should be sent via the following to the indicated addresses:

1. EFS-Bio (<http://www.uspto.gov/ebc/efs/downloads/documents.htm> , EFS Submission User Manual - ePAVE)
2. U.S. Postal Service: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
3. Hand Carry, Federal Express, United Parcel Service, or other delivery service (EFFECTIVE 06/05/04): U.S. Patent and Trademark Office, 220 20th Street S., Customer Window, Mail Stop Sequence, Crystal Plaza Two, Lobby, Room 1B03, Arlington, VA 22202

Revised 05/17/04

Raw Sequence Listing Error Summary

ERROR DETECTED	SUGGESTED CORRECTION	SERIAL NUMBER: 10/797,553

ATTN: NEW RULES CASES: PLEASE DISREGARD ENGLISH "ALPHA" HEADERS, WHICH WERE INSERTED BY PTO SOFTWARE

1 _____ Wrapped Nucleics
Wrapped Aminos

The number/text at the end of each line "wrapped" down to the next line. This may occur if your file was retrieved in a word processor after creating it. Please adjust your right margin to .3; this will prevent "wrapping."

2 _____ Invalid Line Length   The rules require that a line not exceed 72 characters in length. This includes white spaces.

3 _____ Misaligned Amino
Numbering

The numbering under each 5th amino acid is misaligned. Do not use tab codes between numbers; use space characters, instead.

4 _____ Non ASCII

The submitted file was not saved in ASCII(DOS) text, as required by the Sequence Rules. Please ensure your subsequent submission is saved in ASCII text.

5 _____ Variable Length

Sequence(s) _____ contain n's or Xaa's representing more than one residue. Per Sequence Rules, each n or Xaa can only represent a single residue. Please present the maximum number of each residue having variable length and indicate in the <220>-<223> section that some may be missing.

6 _____ PatentIn 2.0
"bug"

A "bug" in PatentIn version 2.0 has caused the <220>-<223> section to be missing from amino acid sequences(s) _____. Normally, PatentIn would automatically generate this section from the previously coded nucleic acid sequence. Please manually copy the relevant <220>-<223> section to the subsequent amino acid sequence. This applies to the mandatory <220>-<223> sections for Artificial or Unknown sequences.

7 _____ Skipped Sequences
(OLD RULES)

Sequence(s) _____ missing. If intentional, please insert the following lines for each skipped sequence
(2) INFORMATION FOR SEQ ID NO:X: (insert SEQ ID NO where "X" is shown)
(i)   SEQUENCE CHARACTERISTICS: (Do not insert any subheadings under this heading)
(xi) SEQUENCE DESCRIPTION:SEQ ID NO:X: (insert SEQ ID NO where "X" is shown)
This sequence is intentionally skipped

Please also adjust the "(ii) NUMBER OF SEQUENCES " response to include the skipped sequences

8 _____ Skipped Sequences
(NEW RULES)

Sequence(s) _____ missing. If intentional, please insert the following lines for each skipped sequence
<210> sequence id number
<400> sequence id number
000

9 _____ Use of n's or Xaa's
(NEW RULES)

Use of n's and/or Xaa's have been detected in the Sequence Listing.
Per 1.823 of Sequence Rules, use of <220>-<223> is MANDATORY if n's or Xaa's are present
In <220> to <223> section, please explain location of n or Xaa, and which residue n or Xaa represents.

10 _____ Invalid <213>
Response

Per 1.823 of Sequence Rules, the only valid <213> responses are: Unknown, Artificial Sequence, or scientific name (Genus/species). <220>-<223> section is required when <213> response is Unknown or is Artificial Sequence

11 _____ Use of <220>

Sequence(s) _____ missing the <220> "Feature" and associated numeric identifiers and responses.
Use of <220> to <223> is MANDATORY if <213> "Organism" response is "Artificial Sequence" or "Unknown." Please explain source of genetic material in <220> to <223> section.
(See "Federal Register," 06/01/1998, Vol. 63, No. 104, pp. 29631-32)   (Sec. 1.823 of Sequence Rules)

12 _____ PatentIn 2.0
"bug"

Please do not use "Copy to Disk" function of PatentIn version 2.0. This causes a corrupted file, resulting in missing mandatory numeric identifiers and responses (as indicated on raw sequence listing). Instead, please use "File Manager" or any other manual means to copy file to floppy disk.

13 _____ Misuse of n/Xaa   "n" can only represent a single nucleotide; "Xaa" can only represent a single amino acid

AMC – Biotechnology Systems Branch – 09/09/2003

IFWO

RAW SEQUENCE LISTING   DATE: 07/22/2004
PATENT APPLICATION: US/10/797,553   TIME: 08:56:02

Input Set : A:\10797553.txt
Output Set: N:\CRF4\07222004\J797553.raw

```
   3 <110> APPLICANT: Moyle, William R.
   4         Xing, Yongna
   6 <120> TITLE OF INVENTION: Protein Knobs
   8 <130> FILE REFERENCE: 268/279-RWJ-01-40
C--> 10 <140> CURRENT APPLICATION NUMBER: US/10/797,553
C--> 11 <141> CURRENT FILING DATE: 2004-03-10
E--> 13 <160> NUMBER OF SEQ ID NOS: 56
  15 <170> SOFTWARE: PatentIn version 3.1
```

66 sequences, see page 9. [handwritten]

Does Not Comply [stamp]
Corrected Diskette Needed [stamp]
(pg. 1-10) [handwritten]

ERRORED SEQUENCES

```
  755 <210> SEQ ID NO: 24
  756 <211> LENGTH: 92
  757 <212> TYPE: PRT
  758 <213> ORGANISM: Artificial Sequence
  760 <220> FEATURE:
  761 <223> OTHER INFORMATION: hCG alpha-subunit with Cys substituted for Lys51
  763 <400> SEQUENCE: 24
  765 Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn Pro
  766 1               5                  10                  15
  769 Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys Cys
  770             20                  25                  30
  773 Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met Leu
  774             35                  40                  45
  777 Val Cys Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys Ser
  778      50                  55                  60
  781 Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His Thr
  782 65                  70                  75                  80
 ~785
     Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu
E--> 786 1               5                  10                  15
  789 Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys Cys
E--> 790             20                  25                  30
  793 Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met Leu
E--> 794             35                  40                  45
  797 Val Gln Cys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys Ser
E--> 798      50                  55                  60
  801 Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His Thr
E--> 802 65                  70                  75                  80
  805 Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser
E--> 806             85                  90
 1183 <210> SEQ ID NO: 36
 1184 <211> LENGTH: 145
```

What is this? [handwritten]

RAW SEQUENCE LISTING   DATE: 07/22/2004
PATENT APPLICATION: US/10/797,553   TIME: 08:56:03

                Input Set : A:\10797553.txt
                Output Set: N:\CRF4\07222004\J797553.raw

1185 <212> TYPE: PRT
1186 <213> ORGANISM: Homo sapiens
1188 <400> SEQUENCE: 36
1190 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
1191 1   5   10   15
1194 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
1195   20   25   30
1198 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
1199   35   40   45
1202 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
1203   50   55   60
1206 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val Val
1207 65   70   75   80
1210 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
1211   85   90   95
1214 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
1215   100   105   110
1218 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
1219   115   120   125
1222 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 1223   130   135   140   *145*
1226 <210> SEQ ID NO: 37
1227 <211> LENGTH: 145
1228 <212> TYPE: PRT
1229 <213> ORGANISM: Artificial Sequence
1231 <220> FEATURE:
1232 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Ser138
1234 <400> SEQUENCE: 37
1236 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
1237 1   5   10   15
1240 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
1241   20   25   30
1244 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
1245   35   40   45
1248 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
1249   50   55   60
1252 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val Val
1253 65   70   75   80
1256 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
1257   85   90   95
1260 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
1261   100   105   110
1264 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
1265   115   120   125
1268 Pro Ser Pro Ser Arg Leu Pro Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln
E--> 1269   130   135   140   *145*
1272 <210> SEQ ID NO: 38
1273 <211> LENGTH: 145
1274 <212> TYPE: PRT

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/10/797,553**

DATE: 07/22/2004
TIME: 08:56:03

Input Set : **A:\10797553.txt**
Output Set: **N:\CRF4\07222004\J797553.raw**

(handwritten: please explain whole sequence.)

```
1275 <213> ORGANISM: Artificial Sequence
1277 <220> FEATURE:
1278 <223> OTHER INFORMATION: hCG beta-subunit residues 101-114 were replaced with their
1279       eta-subunit counterparts, namely hFSH beta-subunit residues 95-10
1280       8
1282 <400> SEQUENCE: 38
1284 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
1285 1               5                   10                  15
1288 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
1289             20                  25                  30
1292 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
1293         35                  40                  45
1296 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
1297     50                  55                  60
1300 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
1301 65                  70                  75                  80
1304 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
1305             85                  90                  95
1308 Thr Thr Asp Cys Thr Val Arg Gly Leu Gly Pro Ser Tyr Cys Ser Phe
1309             100                 105                 110
1312 Gly Glu Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
1313         115                 120                 125
1316 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 1317     130                 135                 140              145
1320 <210> SEQ ID NO: 39
1321 <211> LENGTH: 145
1322 <212> TYPE: PRT
1323 <213> ORGANISM: Artificial Sequence
1325 <220> FEATURE:
1326 <223> OTHER INFORMATION: hCG beta-subunit residues 101-114 were replaced with their
1327       eta-subunit counterparts, namely hFSH beta-subunit residues 95-10
1328       8, and Serine38 in the beta-subunit carboxyterminus of this
1329       analog was replaced with Cys
1331 <400> SEQUENCE: 39
1333 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
1334 1               5                   10                  15
1337 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
1338             20                  25                  30
1341 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
1342         35                  40                  45
1345 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
1346     50                  55                  60
1349 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
1350 65                  70                  75                  80
1353 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
1354             85                  90                  95
1357 Thr Thr Asp Cys Thr Val Arg Gly Leu Gly Pro Ser Tyr Cys Ser Phe
1358             100                 105                 110
1361 Gly Glu Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
```

(handwritten annotations: "hFSH b" circled; "What about the remaining sequence?"; "please explain whole sequence.")

RAW SEQUENCE LISTING   DATE: 07/22/2004
PATENT APPLICATION: US/10/797,553   TIME: 08:56:03

                 Input Set : A:\10797553.txt
                 Output Set: N:\CRF4\07222004\J797553.raw

      1362   115   120   125
      1365 Pro Ser Pro Ser Arg Leu Pro Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln
E--> 1366   130   135   140   145
      1729 <210> SEQ ID NO: 45
      1730 <211> LENGTH: 125
      1731 <212> TYPE: PRT
      1732 <213> ORGANISM: Artificial Sequence
      1734 <220> FEATURE:
      1735 <223> OTHER INFORMATION: hCGbeta,delta116-135,S138C
      1737 <400> SEQUENCE: 45
      1739 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
      1740 1   5   10   15
      1743 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
      1744   20   25   30
      1747 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
      1748   35   40   45
      1751 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
      1752   50   55   60
      1755 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val Val
      1756 65   70   75   80
      1759 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
      1760   85   90   95
      1763 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
      1764   100   105   110
      1767 Pro Arg Phe Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln
E--> 1768   115   120   125
      1863 <210> SEQ ID NO: 48
      1864 <211> LENGTH: 140
      1865 <212> TYPE: PRT
      1866 <213> ORGANISM: Artificial Sequence
      1868 <220> FEATURE:
      1869 <223> OTHER INFORMATION: hCGbeta,delta131-135,S138C
      1871 <400> SEQUENCE: 48
      1873 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
      1874 1   5   10   15
      1877 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
      1878   20   25   30
      1881 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
      1882   35   40   45
      1885 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
      1886   50   55   60
      1889 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val Val
      1890 65   70   75   80
      1893 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
      1894   85   90   95
      1897 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
      1898   100   105   110
      1901 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
      1902   115   120   125

please see error explanation on page 12. [handwritten]

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/10/797,553**

DATE: 07/22/2004
TIME: 08:56:03

Input Set : **A:\10797553.txt**
Output Set: **N:\CRF4\07222004\J797553.raw**

please explain what the source of genetic material(s) is? —Invalid respon [handwritten]

```
  1905 Pro Ser Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln
E-->  1906      130                     135            140
  2143 <210> SEQ ID NO: 56
  2144 <211> LENGTH: 10
  2145 <212> TYPE: PRT
  2146 <213> ORGANISM: Artificial Sequence
  2148 <220> FEATURE:
  2149 <223> OTHER INFORMATION: Xl-Asp-Asp-Asp-Asp-Lys-Ser-Ym-Cys-Zn, where X, Y, and Z
           refer to
  2150        any tail portion amino acids and l, m, and n refer to the lengths
  2151        of the tail portion amino acids
  2153 <220> FEATURE:
  2154 <221> NAME/KEY: MISC_FEATURE
  2155 <223> OTHER INFORMATION: Xaa refers to any tail portion amino acids and n refers to
           the
  2156        lengths of the tail portion amino acids
  2160 <400> SEQUENCE: 56
E--> 2162 Xaa Asp Asp Asp Asp Lys Ser Xaa Cys Xaa
E--> 2163 1               5               10
  2167 <210> SEQ ID NO: 57
  2168 <211> LENGTH: 92
  2169 <212> TYPE: PRT
C--> 2170 <213> ORGANISM: Artifical Sequence
  2172 <220> FEATURE:
  2173 <223> OTHER INFORMATION: An hCG truncated (-subunit analog fused to the hCG alpha-
carboxyterminus
  2175 <400> SEQUENCE: 57
  2177 Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn Pro
  2178 1               5                   10                  15
  2180 Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys Cys
  2181            20                  25                  30
  2183 Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met Leu
  2184            35                  40                  45
  2186 Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys Ser
  2187        50                  55                  60
  2189 Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His Thr
  2190 65                  70                  75                  80
  2192 Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser Asp Asp Pro Arg
E--> 2193 85 90           85   95        90              95
  2195 Phe Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln
E--> 2196 100 105       100            105
  2198 <210> SEQ ID NO: 58
  2199 <211> LENGTH: 145
  2200 <212> TYPE: PRT
  2201 <213> ORGANISM: Artificial Sequence
  2203 <220> FEATURE:
  2204 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Arg94
  2206 <400> SEQUENCE: 58
  2208 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
  2209 1               5                   10                  15
  2212 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
  2213            20                  25                  30
```

—Found 107 Artificial [handwritten]

—Do not show "N", "Xaa" can only represent one amino acid. See item #5 on error summary sheet. [handwritten]

```
2216 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
2217         35              40              45
2220 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
2221      50              55              60
2224 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
2225 65              70              75              80
2228 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Cys Arg Ser
2229              85              90                  95
2232 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
2233              100             105             110
2236 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
2237         115             120             125
2240 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 2241    130             135             140                    145
2244 <210> SEQ ID NO: 59
2245 <211> LENGTH: 145
2246 <212> TYPE: PRT
2247 <213> ORGANISM: Artificial Sequence
2249 <220> FEATURE:
2250 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Arg95
2252 <400> SEQUENCE: 59
2254 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
2255 1               5               10              15
2258 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
2259              20              25              30
2262 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
2263         35              40              45
2266 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
2267      50              55              60
2270 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
2271 65              70              75              80
2274 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Cys Ser
2275              85              90                  95
2278 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
2279              100             105             110
2282 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
2283         115             120             125
2286 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 2287    130             135             140                    145
2290 <210> SEQ ID NO: 60
2291 <211> LENGTH: 145
2292 <212> TYPE: PRT
2293 <213> ORGANISM: Artificial Sequence
2295 <220> FEATURE:
2296 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Ser96
2298 <400> SEQUENCE: 60
2300 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
2301 1               5               10              15
2304 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
```

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/10/797,553**

DATE: 07/22/2004
TIME: 08:56:03

Input Set : **A:\10797553.txt**
Output Set: **N:\CRF4\07222004\J797553.raw**

```
2305                20                    25                    30
2308 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
2309         35                    40                    45
2312 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
2313      50                    55                    60
2316 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
2317 65                    70                    75                    80
2320 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Cys
2321              85                    90                    95
2324 Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
2325            100                   105                   110
2328 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
2329         115                   120                   125
2332 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
```
E--> 2333   130   135   140   *145*
```
2335 <210> SEQ ID NO: 61
2336 <211> LENGTH: 145
2337 <212> TYPE: PRT
2338 <213> ORGANISM: Artificial Sequence
2340 <220> FEATURE:
2341 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Thr97
2343 <400> SEQUENCE: 61
2345 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
2346 1             5                    10                    15
2349 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
2350              20                    25                    30
2353 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
2354         35                    40                    45
2357 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
2358      50                    55                    60
2361 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
2362 65                    70                    75                    80
2365 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
2366              85                    90                    95
2369 Cys Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
2370              100                   105                   110
2373 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
2374         115                   120                   125
2377 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
```
E--> 2378   130   135   140   *145*
```
2380 <210> SEQ ID NO: 62
2381 <211> LENGTH: 145
2382 <212> TYPE: PRT
2383 <213> ORGANISM: Artificial Sequence
2385 <220> FEATURE:
2386 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Thr98
2388 <400> SEQUENCE: 62
2390 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
2391 1             5                    10                    15
```

RAW SEQUENCE LISTING   DATE: 07/22/2004
PATENT APPLICATION: US/10/797,553   TIME: 08:56:03

Input Set : A:\10797553.txt
Output Set: N:\CRF4\07222004\J797553.raw

```
        2394 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
        2395             20                  25                  30
        2398 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
        2399         35                  40                  45
        2402 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
        2403     50                  55                  60
        2406 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
        2407 65                  70                  75                  80
        2410 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
        2411             85                  90                  95
        2414 Thr Cys Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
        2415         100                 105                 110
        2418 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
        2419         115                 120                 125
        2422 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 2423     130                 135                 140                 145
        2425 <210> SEQ ID NO: 63
        2426 <211> LENGTH: 145
        2427 <212> TYPE: PRT
        2428 <213> ORGANISM: Artificial Sequence
        2430 <220> FEATURE:
        2431 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Asp99
        2433 <400> SEQUENCE: 63
        2435 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
        2436 1                   5                   10                  15
        2439 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
        2440             20                  25                  30
        2443 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
        2444         35                  40                  45
        2447 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
        2448     50                  55                  60
        2451 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
        2452 65                  70                  75                  80
        2455 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Ser
        2456             85                  90                  95
        2459 Thr Thr Cys Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp
        2460         100                 105                 110
        2463 Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
        2464         115                 120                 125
        2467 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 2468     130                 135                 140                 145
        2470 <210> SEQ ID NO: 64
        2471 <211> LENGTH: 95
        2472 <212> TYPE: PRT
C--> 2473 <213> ORGANISM: Artifical Sequence
        2475 <220> FEATURE:
        2476 <223> OTHER INFORMATION: An hCG alpha-subunit analog with Gly-Gly-Cys at its
carboxyterminus
        2478 <400> SEQUENCE: 64
        2480 Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn Pro
```

RAW SEQUENCE LISTING   DATE: 07/22/2004
PATENT APPLICATION: US/10/797,553   TIME: 08:56:03

              Input Set : A:\10797553.txt
              Output Set: N:\CRF4\07222004\J797553.raw

```
2481 1               5                    10                  15
2483 Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys Cys
2484             20                  25                  30
2486 Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met Leu
2487         35                  40                  45
2489 Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys Ser
2490     50                  55                  60
2492 Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His Thr
2493 65                  70                  75                  80
2495 Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser Gly Gly Cys
E--> 2496 86 90              85    95          90                    95
2499 <210> SEQ ID NO: 65
2500 <211> LENGTH: 92                    Artificial
2501 <212> TYPE: PRT
C--> 2502 <213> ORGANISM: Artificial Sequence
2504 <220> FEATURE:
2505 <223> OTHER INFORMATION: An hCG alpha-subunit analog with Asp in place of Asn52 and
Cys in place of Ser92
2507 <400> SEQUENCE: 65
2509 Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn Pro
2510 1               5                    10                  15
2512 Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys Cys
2513             20                  25                  30
2515 Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met Leu
2516         35                  40                  45
2518 Val Gln Lys Asp Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys Ser
2519     50                  55                  60
2521 Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His Thr
2522 65                  70                  75                  80
2524 Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser
E--> 2525 87 90              85          90
2528 <210> SEQ ID NO: 66
2529 <211> LENGTH: 145
2530 <212> TYPE: PRT
2531 <213> ORGANISM: Artificial Sequence
2533 <220> FEATURE:
2534 <223> OTHER INFORMATION: hCG beta-subunit with Cys substituted for Ser96 and hFSH
beta-subunit residues 95-108 for hCG beta-subunit residues 101-108
2536 <400> SEQUENCE: 66
2538 Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr Leu
2539 1               5                    10                  15
2542 Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr Thr
2543             20                  25                  30
2546 Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly Val
2547         35                  40                  45
2550 Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg Phe
2551     50                  55                  60
2554 Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val Val
2555 65                  70                  75                  80
2558 Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg Cys
2559             85                  90                  95
```

Handwritten annotations: "Artificial"; "Ser is at this location."; "Ser"; "Last sequence in submitted file. See page 10 a/so."; "See page 1."

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/10/797,553**

DATE: 07/22/2004
TIME: 08:56:03

Input Set : **A:\10797553.txt**
Output Set: **N:\CRF4\07222004\J797553.raw**

```
2562 Thr Thr Asp Cys Thr Val Arg Gly Leu Gly Pro Ser Tyr Cys Ser Phe
2563         100             105             110
2566 Gly Glu Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
2567         115             120             125
2570 Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
E--> 2571         130             135             140
```
145

RAW SEQUENCE LISTING ERROR SUMMARY   DATE: 07/22/2004
PATENT APPLICATION: **US/10/797,553**   TIME: 08:56:04

Input Set : **A:\10797553.txt**
Output Set: **N:\CRF4\07222004\J797553.raw**

Invalid Line Length:
The rules require that a line not exceed 72 characters in length. This includes spaces.

Seq#:24; Line(s) 785
Seq#:57; Line(s) 2173
Seq#:65; Line(s) 2505
Seq#:66; Line(s) 2534

VARIABLE LOCATION SUMMARY   DATE: 07/22/2004
PATENT APPLICATION: US/10/797,553   TIME: 08:56:04

        Input Set : **A:\10797553.txt**
        Output Set: **N:\CRF4\07222004\J797553.raw**

Use of n's or Xaa's(NEW RULES):   *Error explanation: Ⓡ*
Use of n's and/or Xaa's have been detected in the Sequence Listing.
Use of <220> to <223> is **MANDATORY** if n's or Xaa's are present.
in <220> to <223> section, please explain location of n or Xaa, and which
residue n or Xaa represents.

VERIFICATION SUMMARY   DATE: 07/22/2004
PATENT APPLICATION: **US/10/797,553**   TIME: 08:56:04

           Input Set : **A:\10797553.txt**
           Output Set: **N:\CRF4\07222004\J797553.raw**

L:10 M:270 C: Current Application Number differs, Replaced Current Application Number
L:11 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:786 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:24
M:332 Repeated in SeqNo=24
L:806 M:252 E: No. of Seq. differs, <211> LENGTH:Input:92 Found:184 SEQ:24
L:1223 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:36
L:1269 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:37
L:1317 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:38
L:1366 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:39
L:1768 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:45
L:1906 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:48
L:2162 M:258 W: Mandatory Feature missing, <222> Tag not found for SEQ ID#:56
L:2162 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:56 after pos.:0
L:2162 M:333 E: Wrong sequence grouping, Amino acids not in groups!
L:2163 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:56
L:2170 M:220 C: Keyword misspelled or invalid format, <213> ORGANISM for SEQ ID#:57
L:2193 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:57
M:332 Repeated in SeqNo=57
L:2196 M:252 E: No. of Seq. differs, <211> LENGTH:Input:92 Found:107 SEQ:57
L:2241 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:58
L:2287 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:59
L:2333 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:60
L:2378 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:61
L:2423 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:62
L:2468 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:63
L:2473 M:220 C: Keyword misspelled or invalid format, <213> ORGANISM for SEQ ID#:64
L:2496 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:64
L:2502 M:220 C: Keyword misspelled or invalid format, <213> ORGANISM for SEQ ID#:65
L:2525 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:65
L:2571 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:66
L:13 M:203 E: No. of Seq. differs, <160> Number Of Sequences:Input (56) Counted (66)